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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,630	08/06/2003	Guy M. Danner	H-356	1629
26245 7590 02/07/2007 DAVID J COLE E INK CORPORATION 733 CONCORD AVE CAMBRIDGE, MA 02138-1002			EXAMINER BODDIE, WILLIAM	
			ART UNIT	PAPER NUMBER
			2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/07/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/604,630	<b>Applicant(s)</b> DANNER ET AL.	
	<b>Examiner</b> William L. Boddie	<b>Art Unit</b> 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 1-10-07.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-11 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-11 and 22-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. In an amendment dated, January 10<sup>th</sup>, 2007, the Applicant cancelled claims 4 and 21, and amended claims 1 and 11. Currently claims 1-3, 5-11 and 22-26 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 10<sup>th</sup>, 2007 has been entered.

#### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-3, 5-11 and 22-26 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1-3 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al. (US 6,312,304) in view of Leibowitz (US 4,689,110).

**With respect to claim 1**, Duthaler discloses, an electro-optic display comprising:  
a layer of reflective electro-optic material (18 in fig. 1) capable of changing its optical state on application of an electric field thereto (col. 3, lines 61-65);

an electrode arranged to apply an electric field to the layer of electro-optic material (24 in fig. 2);

a heat generating component in heat conducting relationship with the layer of electro-optic material (74 in fig. 6a/b), the heat generating component being disposed on the opposed side of the electrode from the layer of electro-optic material (seems clear from figs. 6a/b),

wherein a printed circuit board (70 in fig. 6a/b) is placed between the heat generating component and the electrode, the printed circuit board extending across the whole area of the layer of electro-optic material (clear from figs. 6a/b).

Duthaler does not explicitly disclose, a heat shield disposed between the heat generating component and the electrode, the heat shield comprising a layer of thermally insulating material and a layer of thermally conducting material, the layer of thermally conducting material being disposed between the layer of thermally insulating material and the layer of electro-optic material.

Leibowitz discloses, creating a printed circuit board / heat shield with layers of thermally conducting material (copper, 20 in fig. 2) and layers of thermally insulating material (PTFE, 18 in fig. 2); wherein the insulating and conducting materials extend across the entire board (clear from fig. 2).

Duthaler and Leibowitz are analogous art because they directed to a similar problem area, namely manufacturing of printed circuit boards and subsequent packaging.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the circuit board of Duthaler (70 in fig. 6b) with the heat-shielded multi-layered circuit board of Leibowitz.

The motivation for doing so would have been to improve the coefficient of thermal expansion, thermal conductivity, and mechanical strength of the circuit board (Leibowitz; col. 3, lines 13-19).

Therefore it would have been obvious to combine Leibowitz and Duthaler for the benefit of thermal conductivity and mechanical strength to obtain the invention as specified in claim 1.

**With respect to claim 2**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 1 (see above).

Leibowitz further discloses, wherein the heat shield comprises a printed circuit board (figs. 1 and 2) having a conductive layer therein (copper layers, 20 in fig. 2).

**With respect to claim 3**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 1 (see above).

Leibowitz further discloses, wherein the heat shield comprises a plurality of layers of thermally insulating material (18 in fig. 2; PTFE) and a plurality of layers of thermally conducting material (20 in fig. 2; Copper), the layers of thermally insulating material alternating with the layers of thermally conducting material (clear from fig. 2),

and one layer of thermally conducting material (note the outer layers of copper, 20 in fig. 2) being disposed between the layers of thermally insulating material and the layer of electro-optic material (upon combining the two inventions this limitation would clearly be satisfied).

**With respect to claim 7**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 1 (see above).

Duthaler further discloses, wherein the electro-optic material comprises a rotating bichromal member material or an electrochromic material (col. 7, lines 8-45).

**With respect to claim 8**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 1 (see above).

Duthaler further discloses, wherein the electro-optic material comprises an electrophoretic material (col. 7, lines 8-9).

**With respect to claim 9**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 8 (see above).

Duthaler further discloses, wherein the electrophoretic material comprises at least one capsule having a capsule wall encapsulating a suspending fluid and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving therethrough on application of an electric field to the electrophoretic material (col. 7, lines 8-45).

**With respect to claim 10**, Leibowitz and Duthaler disclose, an electro-optic display according to claim 8 (see above).

Duthaler further discloses, wherein the electrophoretic material comprises a substrate having a plurality of closed cells formed therein, each of the cells having therein a suspending fluid and a plurality of electrically charge particles suspended in the suspending fluid and capable of moving therethrough on application of an electric field to the electrophoretic material (col. 7, line 54 – col. 8, line 38).

6. Claim 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al. (US 6,312,304) in view of Leibowitz et al. (US 4,689,110).

**With respect to claim 5,** Leibowitz and Duthaler disclose, an electro-optic display according to claim 1 (see above).

Leibowitz further discloses, wherein the heat shield comprises a polymeric film ( PTFE (polytetrafluoroethylene)) having a metal layer (copper, 20 in fig. 2) formed thereon (col. 3, lines 58-62).

**With respect to claim 6,** Duthaler and Leibowitz disclose, an electro-optic display according to claim 5 (see above).

Leibowitz further discloses coating the polymeric layer with a conductive metal. While Leibowitz prefers copper (col. 4, lines 52-53), it would have been obvious to use aluminum instead as it is well known as a conductive metal.

The motivation for doing so would have been the decreased cost of aluminum over copper.

7. Claims 11 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al. (US 6,312,304) in view of Leibowitz et al. (US 4,689,110) and further in view of Sato et al. (US 5,869,919).

**With respect to claim 11**, Duthaler discloses, an electro-optic display comprising: a layer of reflective electro-optic material (18 in fig. 1) capable of changing its optical state on application of an electric field thereto (col. 3, lines 61-65);

an electrode arranged to apply an electric field to the layer of electro-optic material (24 in fig. 3);

a heat generating component in heat conducting relationship with the layer of electro-optic material (74 in fig. 6a/b), the heat generating component being disposed on the opposed side of the electrode from the layer of electro-optic material (clear from figs. 6a/b).

wherein a printed circuit board (70 in fig. 6a/b) is placed between the heat generating component and the electrode, the printed circuit board extending across the whole area of the layer of electro-optic material (clear from figs. 6a/b).

Duthaler does not explicitly disclose, a heat shield disposed between the heat generating component and the electrode, the heat shield comprising a layer of thermally conducting material.

Leibowitz discloses, creating a printed circuit board / heat shield with layers of thermally conducting material (copper, 20 in fig. 2); wherein conducting materials extend across the entire board (clear from fig. 2).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the circuit board of Duthaler (70 in fig. 6b) with the heat-shielded multi-layered circuit board of Leibowitz.



The motivation for doing so would have been to improve the coefficient of thermal expansion, thermal conductivity, and mechanical strength of the circuit board (Leibowitz; col. 3, lines 13-19).

Neither Leibowitz nor Duthaler expressly disclose that an air gap is present between the circuit board and the electrode of the display.

Sato discloses, a display device having an air gap (note the flowing arrows) between a circuit board (820 in fig. 8) and the electrodes of a display (201 in fig. 8).

Leibowitz, Duthaler and Sato are all analogous art because they are all from the same problem area namely circuit board manufacturing and packaging.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include an air gap between the circuit board, of Leibowitz, and the display electrodes of Duthaler.

The motivation for doing so would have been to effectively cool the display as well as the drive circuits (Sato; col. 12, lines 38-42).

Therefore it would have been obvious to combine Leibowitz with Duthaler and subsequently Sato for the benefit of improved thermal conductivity, and effectively cooling the drive circuits to obtain the invention as specified in claim 11.

**With respect to claims 22-25**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Furthermore as these claims are identical in their limitations to claims 7-10, these claims are rejected on the same merits shown above in the rejections of claims 7-10.

**With respect to claim 26**, Leibowitz and Duthaler disclose, an electro-optic display according to claims 1 (see above).

Neither Leibowitz nor Duthaler expressly disclose that an air gap is present between the circuit board and the electrode of the display.

Sato discloses, a display device having an air gap (note the flowing arrows) between a circuit board (820 in fig. 8) and the electrodes of a display (201 in fig. 8).

Leibowitz, Duthaler and Sato are all analogous art because they are all from the same problem area namely circuit board manufacturing and packaging.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include an air gap between the circuit board, of Leibowitz, and the display electrodes of Duthaler.

The motivation for doing so would have been to effectively cool the display as well as the drive circuits (Sato; col. 12, lines 38-42).

Therefore it would have been obvious to combine Leibowitz with Duthaler and subsequently Sato for the benefit of improved thermal conductivity, and effectively cooling the drive circuits to obtain the invention as specified in claim 26.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William L. Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wlb  
1/30/07

AMR A. AWAD  
SUPERVISORY PATENT EXAMINER  
